TIMS OBSERVATIONS OF SURFACE EMISSIVITY IN HAPEX-SAHEL

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1. INTRODUCTION

The Thermal Infrared Multispectral Scanner (TIMS) was flown on the NASA C-130 aircraft for a series of 12 flights during HAPEX- Sahel at altitudes ranging from 0.25 to 6km (0.6 to 15 m resolution), TIMS provides coverage of the 8 to 12 micrometer thermal infrared band in 6 contiguous channels. Thus it is possible to observe the spectral behavior of the surface emissivit y over this wavelength interval,

2. DISCUSSION

A high resolution image, 1.5m, of the west central site on 2 September was processed and the spectral behaviors of the millet and fallow grassland sites were determined. There was a 4 to 5 K difference in the brightness temperature over the 6 channels when significant bare soil was visible. Channels 1 to 3 (8.2 to 9.6 micrometer) were 4-5 K cooler than the longer wavelength channels which is characteristic of soils rich in quartz. These differences in brightness were converted to emissivit y differences using both the emissivity normalization and alpha residuals methods. Both methods yielded about the same difference in emissivity over the 6 channels, i.e. 0.09. However the alpha residuals methods yielded higher absolute values. As expected for a group of vegetated pixels, there was little difference in emissivity, less than 0.02 over the 6 channels, and the average was about 0.99. The extracted vegetation temperature was close to the air temperature, while for the bare soil it was at least 10 K higher.